Optimization of anti-cobratoxins for treatment of neurotoxic envenomings

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ABSTRACT

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Brief description of research area:

Cobras (*Naja* spp.) are some of the most venomous and dangerous snakes worldwide, responsible for high mortality and morbidity. The most toxic components of cobra venoms are cobratoxins, which target the nicotinic acetylcholine receptors (nAChRs) responsible for neuromuscular transmission. Inhibition of nAChRs may lead to respiratory arrest with death as a result within 3-12 hr after a bite from a cobra. Early parental administration of appropriate antivenom is the cornerstone of life saving snakebite therapy. However, current antivenoms are still produced by animal immunization, which is a laborious and expensive process yielding highly immunogenic antivenoms due to the heterologous nature of equine antibodies in the antivenom. In contrast, novel antivenom based on synthetic peptides may offer an alternative solution, which is less expensive and cause less side effects.

What we know:

A peptide-based antitoxin lead was previously discovered in our lab through phage display selection. The lead binds to α-cobratoxin in ITC experiments and is able to inhibit α-cobratoxin binding to the nAChR in TEVC experiments.

What we need:

Currently, we are working in an approach for optimizing the peptide lead by designing and characterizing improved analogues. The poster will include the methodology and results of optimized peptide leads to include in promising peptide-based antitoxins.

This may pave the way for treating the clinical manifestations of neurotoxic envenomings caused by long α-neurotoxins, thus providing protection against many cobra species.